CLAIMS

1. A micro-electromechanical fluid ejection device that comprises

a substrate that incorporates drive circuitry;

a fluid inlet channel defined through the substrate;

a static nozzle chamber structure that is positioned on the substrate to extend from the substrate and that defines a static wall that bounds the fluid inlet channel to form part of a nozzle chamber;

an active nozzle chamber structure that has a roof wall that defines a fluid ejection port and an active wall that depends from the roof wall about the static wall, to define a remaining part of the nozzle chamber, the active structure being displaceable with respect to the static structure towards and away from the substrate respectively to reduce and increase a volume of the nozzle chamber so that fluid in the nozzle chamber is ejected from the fluid ejection port;

a fluid displacement member that is positioned on the static wall to define a fluid displacement area that faces the roof wall to facilitate ejection of fluid from the fluid ejection port;

at least two actuators that are connected to the drive circuitry and operatively arranged with respect to the active structure to displace the active structure towards and away from the substrate on receipt of an actuating electrical signal from the drive circuitry; and

a coupling structure that is interposed between each actuator and the active structure, the coupling structures being configured and connected to the active structure to impart substantially rectilinear movement to the active structure on operation of the actuators.

2. A fluid ejection device as claimed in claim 1, which includes a pair of substantially identical actuators that are positioned on respective, opposite sides of the active structure.

3. A fluid ejection device as claimed in claim 1, in which each actuator is a thermal bend actuator that is anchored to the substrate at one end to be in electrical contact with the

drive circuitry and movable with respect to the substrate at an opposite end on receipt of an electrical signal from the drive circuitry.

4. A fluid ejection device as claimed in claim 3, in which each actuator includes an elongate actuator arm that is anchored at a fixed end to the substrate and is connected to the drive circuitry, each actuator arm being of an electrically conductive material and having an active portion that defines a heating circuit that is in electrical contact with the drive circuitry to heat and expand on receipt of an electrical signal from the drive circuitry and to cool and contract on termination of that signal and a passive portion that is spaced from the active portion relative to the substrate so that the actuator arm bends and straightens as a result of differential thermal expansion and contraction and an opposed moving end undergoes reciprocal arcuate movement, the actuator arms being oriented with the moving ends aligned and facing each other, the coupling structures being interposed between respective actuator arms and the active structure and being configured so that said arcuate movement is translated into substantially rectilinear movement of the active structure.

5. A fluid ejection device as claimed in claim 1, in which the static structure has an inner portion and an outer portion that together define the static wall, an inwardly directed ledge being positioned on a free end of the inner portion and an outwardly directed sealing formation being positioned on a free end of the outer portion so that the ledge and the sealing formation define the fluid displacement member.

6. A fluid ejection device as claimed in claim 5, in which the sealing formation includes a re-entrant portion that opens towards the substrate and a lip that is positioned on the re-entrant portion to extend outwardly therefrom, the lip and a free edge of the active wall being shaped and positioned with respect to each other so that when the nozzle chamber is filled with a liquid, the lip and said free edge define anchor points for a meniscus, so that the meniscus can define a fluidic seal to inhibit leakage of the liquid from the nozzle chamber during operation.

7. A fluid ejection device as claimed in claim 1, which includes two pairs of substantially identical actuators, the actuators of each pair positioned on respective opposite sides of the active structure.